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PALESTINE AS ILLUSTRATING GEOLOGICAL AND GEOGRAPHICAL CONTROLS.*

BY

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THE SCENERY.—We have seen that most of the historic hills of Palestine bear to the plateaux the same relation as that of the finished cameo to the flat surface of a still uncut plate of onyx, agate or shell. They have been etched out by rivers, by the erosive power of rain, and by the freighting of waste down the wadies to lower ground. Thus, the tourist on Tabor, Little Hermon, Ebal, Gerizim or Gilead will not only look down into the Ghôr; he has also unimpeded views toward every other point of the compass, across valleys of erosion which encircle the hills. Mt. Ebal, where the six tribes of Israel pronounced the curse on disobedience, is sundered from Gerizim, on which the other six tribes chanted a blessing on obedience, by just such a wady, narrow and deep, across which the voice of a single person carries well. Others of the hills are, in a sense, very comparable to the buttes that stand up on our western plains, and bear witness to well-advanced destruction of the surrounding parts of the plateau.

It remains for us to note the conditions which have produced the scenic details of the plateaux. Great Lebanon and Hermon may be taken as types. From the foot to the summit of each of these nine thousand-foot "mountains" is as great a climb as that from the plains to the top of most of the peaks in the North American Cordilleras. Expecting much of scenic beauty from massifs of so great altitudes, the average tourist is disappointed in these two; yet this very disappointment is of value if it be accompanied by the conviction that the American Rocky Mountains or Swiss Alps on the one hand, and the Syrian uplands on the other, furnish two entirely different kinds of landscape. It is not the general difference of vegetation, the contrast of the bare Palestinian scarps and the wooded slopes of the Rockies; for he would find on the treeless spurs of the Caucasus even more grandeur and wild confusion than

* Continued from Vol. XXXI, page 458.

in many justly famous American mountains. In the Lebanons there is less of grace and serrate irregularity than in the Rockies or in the Alps; more of massiveness, simplicity and strength. The contrast is striking; the cause definite, and not far to seek. Either in the Alps or in Lebanon the rocks are of differing hardness, and they will resist erosion in quite different proportion. Where, as in Lebanon, the strata, for the most part, lie nearly horizontal, the process of wear will produce horizontal lines on the edges of the beds, and vertical lines in the profiles of the retreating cliffs; but the folded, contorted and otherwise deformed strata of the Alps will so yield to the destructive activities of meteoric waters that the fretted edges of the layers will run in all directions in plan and stand at all angles, from vertical to horizontal. There results, in the one case, the scenery of a true plateau, albeit the "glory of Lebanon," in the other that of a typical vigorous *mountain*; the sculpture of a Colorado cañon is possible to the one, the fashioning of an Inn Valley to the other.

THE CLIMATE.—It would be quite out of place to describe here the ultimate causes of the Palestinian climate, even should they all be known. Some of the proximate causes may, however, be noted.

The complex phenomena which make up climate are conveniently grouped about the seasons; in Palestine these number but two, and throughout the Biblical writings only two are mentioned. There is no real spring and autumn in our western sense, for the warmth and dryness of summer has pretty definite limits in the coolness and wet of winter. They are the familiar "dry" and "wet" seasons of many a tropical and sub-tropical land. To this day the beginning of the rainy season occurs usually in late October, as the "early" or "former" rain, all-important to the husbandman as a condition of his ploughing and planting his crops in the ground baked during the hot months of summer. Following a period of drier weather, the heavy rains begin again and continue at intervals until March. Then comes the question whether the precipitation shall last into April, inasmuch as upon this "latter" rain depends the full rounding of the ear and final ripening of the barley, and later of the wheat, for the two chief harvests of Palestine. Full of meaning was this climatic feature of the land of promise: "I will give you the rain of your land in due season, the first rain and the latter rain, that thou mayest gather in thy corn and thy wine and thine oil."

On the other hand, so rare is rain in time of actual harvest

that it was even made the basis of Elijah's miracle in calling upon the Lord, who sent a thunderstorm over the land at time of wheat-harvest.

This trenchant distinction between the seasons as regards precipitation, is, in a large way, not difficult to explain, though too little is known of the meteorology of Palestine to permit of our going into details. In brief, rainfall is a function of wind-direction and of the thermal conditions of the land-surface.

The common winds of summer are those from the north and northwest, which cool the land and go far to account for the salubrity of the country. Like them, the usual afternoon sea-breeze is a "drying" wind, since all these winds are warming up as they pass over the limestone hills and are ready to absorb still more moisture instead of giving it out by condensation. Likewise in summer, for many days at a time, it may be, the wind blows from the east or the southeast, representing the Scriptural "east" wind, the influence of which is typified in its blasting the seven lean ears of Pharaoh's dream. The south wind, "which bringeth heat," is also of the nature of a true sirocco, a hot wind from the desert, laden with desert dust and incapable of furnishing moisture to the plateaux of Palestine.

In their physiological effects the east and southeast winds quite change character as the winter comes on; they become stimulating and bracing. They behave, however, like the cutting and disagreeable north wind in preserving a dry condition. It is the westerly, chiefly the northwest and west, winds that give out the rains of winter. Relatively moist from their long journey over the Mediterranean, they precipitate their load on coming in contact with the cooled surfaces of the coastal plain and plateau, which radiate rapidly the heat derived from a winter sun. Although the average annual rainfall of the plateau is only half that of Boston, Massachusetts, yet this amount of precipitation represents most of that which is afforded by the moisture-bearing wind. By the time it has passed the edge of the escarpment overlooking the Ghôr it is already greatly dried; the sponge has been squeezed. Moreover, this same wind, on descending into the graben, is compressed, thereby warmed and hence endowed with the capacity for more water-vapor. For these reasons, the Ghôr must be content with a rainfall that keeps it, for the most part, in the condition of a typical desert, of a climatic belt remarkably distinct from that of the western plateau. As we might expect, the average annual temperature is much higher (6° C.) than at Jerusalem, and the scanty

flora and fauna of the graben about the Dead Sea are tropical, being allied to those of Egypt and of Hindostan. Impoverished as it is, the westerly wind is yet able to supply the eastern plateau with a certain amount of rainfall, though far less than the more favored slope of the Mediterranean side. The climate of the two plateaux is otherwise somewhat similar, and the orchards and farms of Philistia and of Judæa correspond to the grainfields of Moab.

In these general relationships exists the well-established parallel between the climates of Palestine and of California. For the climatologist, the Coast Range is equivalent to the Judæan Plateau, the Great Valley to the Ghôr, and the Sierra Nevada to the range of Moab. The two countries lie in the horse-latitudes; each has a single cloud-breeding reservoir on the west. The summation of so many similar conditions gives in each land two seasons, an "early" and a "latter" rain, a perennial afternoon sea-breeze, a tendency to the development of "northers," a marked salubrity of climate on the western uplands, a less fertile eastern upland and an intermediate desert lowland.

PHYSIOGRAPHIC CONTROLS.—It has been shown that the topography of Palestine may be explained by reference to a series of geological changes, and that its climate likewise depends, in large part, on the topography and geology. Finally, it may be noted that climate and topography have governed the habitability of Palestine, the industries of its varied inhabitants, and their history—military, political and ethnographic. A convenient phrase has been invented to express the sum of natural conditions which determine in any region the activities of man in the region. These conditions are called "physiographic controls." But little has been done toward developing the doctrine in its detailed application; yet it is to be accounted one of the chief aims of geography, for, not until it be so developed is a thoroughly scientific, political and commercial geography possible. The following paragraphs are intended rather to illustrate the principle of controls than to sketch all the phases of the subject.

The rocks of Palestine, practically without exception, belong to varieties which are competent to furnish good soils, provided there be sufficient rainfall; hence the four zones of rainfall are also well-marked zones of fertility. The richest of all, the Sharon-Philistia plain, corresponds to the coastal plain of alluvium; the next most fertile belt is the western plateau; the eastern plateau has a rather

less-favored vegetation, that soon fades out in the vast desert of extra-Moabite territory in the east. As it is alluvial ground, we should expect the valley of the Jordan to produce heavier crops than the plateau; yet, for reasons already noted, it is a barren plain, except where springs supply water enough to show such capabilities as in the oasis of Jericho. The scantiness of population in the valley is at first sight inexplicable, for the most primitive sort of irrigation would afford abundant harvests. The fact is probably due to the unhealthy nature of the low ground; the few people who do live in the valley are described as feeble in comparison with the other inhabitants of Palestine. The uplands, on the other hand, are very salubrious; Jerusalem, twenty-six hundred feet above the sea, is fever-stricken for quite local causes.

Hand in hand with the food question, is the problem of water-supply. It is only within a few decades, and with the growth of the great cities in Europe and America, that to the people of the more fortunate Western lands, this question has become of real economic importance, *i. e.*, one of supply and demand, which results in actual payment for drinking-water. But in Palestine it was, and is an ever-present question, the occasion for tribal and family ventures, in which the stakes were human lives and the possession of the living waters. We have seen why this should be so: a scant rainfall and the disappearance into subterranean courses of a large proportion of the rain-water, falling on the permeable limestones, have worked together to make the springs and oases the coveted source of wealth for all generations. From Genesis to Revelation, the rejoicing in the beneficial showers and perennial brooks and "fountains" has characterized many of the finest and poetic passages of drama, chronicle or psalm. In rainless Egypt, and Sinai, the people of Israel cherished the promise of their leaders, "For the Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains, and depths that spring out of the valleys and hills." As the light of hope breaks through the wild despair of Zechariah, to whom came the vision of a reconstructed kingdom, he exclaims not only that "at evening time there shall be light," but adds the triumphant note, "It shall be in that day, that living waters shall go out from Jerusalem."

The student of the Hebrew literature cannot be fully sympathetic with his subject unless he visualizes clearly the physical conditions of a perennial water-supply; neither will he appreciate the significance of the numerous references to wells, cisterns and reservoirs or "pools." For that time and country the digging of the

wells of Beersheba by Abraham was like the founding of the great sea port and capital city by Peter the Great, or like the razing of the Bastille—an event of peculiar national importance. The Philistines saw the advantage of holding the larger wells during their military operations; at Bethlehem they caused even David himself to suffer from the thirst which he was too magnanimous to allay at the risk of the “three mighty men of valour.” It will be remembered that, when Moses sent messengers to the king of Edom asking for permission to pass through his country, it was expressly stipulated that the people of Israel would not drink of the Edomite wells, so precious was the store of water!

Not only is rainfall a dominant condition of the varying fertility, salubrity and water-supply of Palestine; it explains in a general way the everyday callings of the present mixed population as it did the similar occupations of early Israel and of the Phœnicians. Sheep-raising has always been the staple industry of Trans-Jordan and of southern Judæa, and it plays a part in the life of the western plateau. It is almost a truism that the shepherd's life is a nomadic life, especially in a region of widely-separated oases and pasturages. For this reason, the patriarch in tents, with his family around him in tents, has persisted in this land from the dawn of history to the present day. Such a life is not a busy one, and the early employment of slaves made it still less absorbing for the stately heads of these migrant tribes. Thence came, as Renan points out, abundant leisure for introspective thought, for reflection on the problems of life. It can hardly be doubted that the many long centuries of nomadic existence had a capital influence in bringing to fruition the unique genius of the Hebrews for the development of moral and religious truth. Renan further shows that such a life forbade the maintenance of temples and of an elaborate worship of idols; that it was therefore easy for the monotheistic idea to take root; that both Judaism and Moslemism originated under these same conditions; and thence that the patriarchal idea may be regarded as “the corner-stone of religious history.” *

The influences of the patriarchal life persisted long after the Israelites had entered the Promised Land. Then their history underwent a complete change, due once more to a physical necessity. Kept from the sea by the doughty Philistine, who, by his energy, resources and superior methods of fighting in the open country, kept at bay the restless Hebrew, the men of Israel never

* Compare the views of Dr. G. A. Smith in his masterly treatise on “The Historical Geography of the Holy Land” (1894).

attained a maritime spirit. Neither did they use the easily-acquired mineral wealth of the Ghôr, since there was little demand for its peculiar products; nor did they mine the immense iron and coal beds of Lebanon. The relatively great fertility of the plateau entailed, however, the possibility of a more comfortable existence, that of the farmer, and his settled abode was taken, for protection, around the numerous towns, which controlled, in addition, the simple manufactures of the times.

Sedentary from this time forth, this people became more and more diversified into distinct tribes, which gained their individuality on account of the varied character of the plateaux. Separated by the deep wadies, by fault-scarp or desert-plain, the tribes gradually differentiated during the centuries, much as the canton-folks of Switzerland are now contrasted with one another. Dialects arose, which it is fair to suppose were non-existent at the time of colonization; jealousies appeared between the nomads and the men of agriculture; many times civil war broke out among the blood relations; and thus we find Jephthah, the Gadite of Mt. Gilead, putting to death Ephraimites from the other side of the graben when he found that they could not pronounce his famous sibilant, and thus revealed their "foreign" extraction.

The influence of the Ghôr in preventing the easy mixture of peoples which were originally of common ancestry, and in bringing about their differentiation, had already been felt in the history of Palestine, for just before the crossing of the Jordan by Israel, the Amorites of the western plateau, once of one blood with the Moabites, had so far forgotten the family tradition that they marched against Moab as against a stranger and conquered the land. On a far larger scale, this mighty barrier kept alive the age-long animosities of the Israelites towards the Moabites, Ammonites and Edomites of the eastern plateau, whose customs, religions and languages had greatly diverged from their own. It is fair to suppose that, had all this country been plain, no such striking differentiation could have taken place, nor an occasion for the refrain, "Edom shall be a possession; Seir also shall be a possession, which were his enemies."

The strategic importance of topography in the Palestinian wars would furnish the subject of a fascinating chapter in the history of that country. The success of foreign arms in the land is not to be attributed to any lack of valor among the Jews, nor to the absence of means for ready defence; it was rather due to the incoherence of the tribes, which, if they had been united under the control of a

single centralized military rule, could very probably have repelled invasion simply by making use of the magnificent natural ramparts of the land. The brave Maccabeans and the energetic Josephus understood their opportunity when they respectively faced the disciplined armies of the Great Antiochus and the legions of Titus. The battles of the three passes and the tragedy of Masada are strong illustrations of the close dependence of national defence on topography. So Barak's army waited for the Syrians on the dome of Tabor, Josephus fortified it, and Napoleon's generals used it as a point of vantage whence they drove the countless Bedouins of 1799 into the marshes of Kishon. To this day the numerous Druzes and Maronites of Lebanon, comparatively safe within their stronghold, have successfully preserved their individuality and religion in the face of Turkish aggression.

It has forcibly struck almost all modern writers on Palestine that its topographic relationships have governed the course of history in an important way quite different from that of influencing the development of the Jewish race, with its religion and its peculiar tribal attributes. A cosmopolitan interest attaches to its position as a long, narrow strip at the extreme end of the great water-way of the ancient civilised world, the Mediterranean, and between the two world-granaries of former days, the Tigris-Euphrates valley and the Nile valley. To the east are the deserts of Syria and Arabia—the most effective of barriers to the advance of armies bent on conquest. These must, then, in passing between Africa and Asia for land operations, use the natural pathway of a fruitful, water-bearing route that the coastal plain and western plateau of Palestine alone supply. Hence this little country has witnessed the march of Egyptian, Babylonian, Assyrian, Persian, Greek, Roman and Turkish troops, led forth to conquer the rich plains of Babylon, of Nineveh or of the Pharaohs, or to secure the only gate opening into the land-route to Persia and India on the one hand and Europe on the other. Alexander the Great opened the door and was successful in keeping it open until he had completed his scheme of world-dominion; Napoleon essayed to reach India by the plain of Esdraelon, Damascus and Persia, but was repulsed by Englishmen at Acre.

Partly because of the shifting of political centres of gravity, partly because of the discovery of other routes, partly because of the use of steamships and of the Suez Canal, Palestine has lost its once commanding position as a military gateway between east and west. The commerce of the Syrian ports has, for similar reasons,

faded into insignificance. For many centuries they had interchanged the goods of the world, not because they possessed good harbors—they are, in fact, among the poorest on the Mediterranean—but because this strip of shore lay near the junction of three continents, the surplus products of which must needs pass that way. Yet, were the political and natural conditions of twenty centuries ago to return, commerce would once more thrive in Tyre and Sidon.

The chief object of the foregoing sketch shall have been met, if the reader recognizes that the geographical facts concerning Palestine form a single great system; that the relief, drainage, climate and resources of that land are all, directly or indirectly, the effects of the geological history, and together, the causal conditions of human life, industry and history within the borders of southern Syria; and that the old Eocene sea-bottom possessed potentialities which had, so to speak, as their logical consequences, the development of a Levant, the existence of a Jordan River, the rise of that marvellous Jewish race, the brilliance of a long-continued Phœnician civilization, the Crusading romance, a Napoleonic campaign and the massacres of the Christian Maronites of a later day. In particular, I would emphasize how excellently well Palestine illustrates the influence of barriers on animal and plant life and on the human inhabitants. Orographic barriers are represented in grabens, fault-blocks, fault-scarps and erosion-scarps; climatic barriers in the wide wastes of desert land in Syria, Arabia and Sinai. We have noted that it was impossible for men to occupy the separate basins, valleys and plateaux without becoming characterized by tribal peculiarities, and hence that a uniformity of population as among the Indians of the Mississippi Valley or of the plains of Paraguay, or among the governments of Great Russia, is here neither expected in theory nor discovered in fact.

The climate has conditioned the nomadic life, and with it the peculiar strength of family life and of the principle of obedience; and has undoubtedly had an important influence in moulding the moral and religious ideas of the Hebrew people. It is, of course, not intended to minimize the difficulty of allowing for the innate, and, as yet, unexplained springs of conduct which were the inheritance of the races of Palestine before they entered the country. Free volition and a particularly enterprising nature must have played a large part in the formation of Phœnician commerce, since the smooth-flowing outline of the Levantine coast-line is, in truth, more a discouragement than an incentive to navigation. Yet we

have seen that, even in this case, there is some good physiographic explanation of the phenomenon.

Finally, a preliminary review of Palestinian physiography from this genetic point of view may be commended to the student of the Old and New Testaments; to narrative and literature it lends a vividness and a concreteness which cannot fail to stimulate both the memory and the appreciative faculty.